

this description, and to the representation of the lamp which accompanies the paper. It was made by Sir Humphry's own hands, and given by him to Dr. Lee, now Lord Bishop of Manchester, whose father was Assistant Secretary to the Royal Society at the time of Davy's Presidency. The excessive simplicity of the contrivance is most remarkable; but this is one of the greatest advantages which attended the invention. As the author remarks in the paper just quoted, "All that the miner requires to ensure security, are small wire cages to surround his candle or lamp, which may be made for a few pence, and of which various modifications may be adopted. And the application of this discovery will not only preserve him from the fire-damp, but enable him to apply it to use and to destroy it at the same time that it gives him a useful light." A month after the invention Sir Humphry informed the Society that his cylinder lamps had been used in two of the most dangerous mines near Newcastle with perfect success.

The following papers were then read:—

1. "On the Structure of the Dental Tissues of Rodentia." By John Tomes, Surgeon-Dentist to Middlesex Hospital. Communicated by William Bowman, Esq., F.R.S.

The author in this paper relates the results obtained from an extensive series of investigations on upwards of sixty of the more typical members of the order Rodentia. He finds, that not only are the teeth of animals of this order distinguished by strongly marked structural peculiarities (hitherto not recognised) from other mammalian teeth, but also that the teeth of the several larger groups are distinguished from each other by modifications in what may be called the rodentia type of dental tissue. Mr. Tomes pointed out, in a paper published in Part 2 for 1849 of the *Phil. Trans.*, that in the teeth of marsupial animals the dentinal tubes are continued into the enamel. In the present communication he shows that the structural peculiarities which characterise and are confined to the teeth of rodents are also mainly resident in the enamel. The earlier pages of the paper are devoted to a description of those structural conditions which are common to the teeth of the whole order. Amongst these, the author finds that the extremities of the dentinal tubes, which in the lower part of the tooth communicate with the pulp-cavity, become in the extruded portion sealed up by the development of a layer of non-tubular tissue which is formed at and near the apex of the pulp-cavity. This closure of the dentinal tubes is not however confined to the teeth of Rodentia, but occurs in all teeth in those parts exposed to wear. A similar condition is found to obtain in the osseous tissue which forms the antlers of the Deer-tribe. If a portion of an antler previous to its losing its periosteum be examined, ordinary Haversian systems are found: but if an antler which has been shed be examined, each of the larger Haversian systems will be found to be lined by a layer of transparent tissue destitute both of lacunæ and canaliculi. The author considers these conditions to indicate the existence of a general law, viz. that dense tubular tissues, when about to be exposed to wear or about to be

cast off, are previously deprived of their connection with nutrient fluids by the development of a layer of non-tubular tissue between them and the vascular surface, with which they were originally connected and from which they derived their nutriment.

In order to facilitate description, Mr. Tomes proposes to use several terms as indicative of the arrangement and number of the component tissues of teeth, which he defines and describes at length.

A minute description of the dental tissues of upwards of fifty species of rodents forms the larger part of the paper. They are taken in the order proposed by Mr. Waterhouse in his arrangement of Rodentia published in Johnston's Physical Atlas. The author has followed this arrangement, because he finds that it accords with the modifications of the dental tissues. The incisors are described as possessing the most strongly marked and constant characters.

The anterior surface of the incisors of many rodents has a deep brown colour, which has been attributed to the presence of a layer of coloured cementum. The author states that the enamel fibres can be traced through this coloured part to the surface of the tooth, and hence regards the colour as a stain resident in the terminal ends of the fibres, and derives the presence of cementum in this part of the tooth.

The great distinguishing structural feature in this order of quadrupeds consists in a lamelliform arrangement of the fibres of the enamel in the inner division of that tissue.

The author then enters into an elaborate and detailed account of the peculiarities of this structure, as exhibited in the *Sciuridæ*, in the different members of the family *Muridæ* in the Hystricine family, the *Leporidæ*, &c., and finally considers the following conclusions as established by these details:—

“That the teeth of some species of the order have specific structural characters by which they can be distinguished from any other known teeth. That in the teeth of all the Rodentia, excepting the family Leporidæ, a portion of the enamel has a lamelliform arrangement of its fibres; that the enamel lamellæ have a different and distinctive character in each of the larger groups, and that the variety of structure is constant throughout the members of the same group;”—“and that the variety in the structure of the dental tissues, with a few isolated exceptions, justifies and accords with the arrangement of the members of the order into the several divisions proposed by Mr. Waterhouse, and deduced by him from the relations of the several parts of the skull.”

It is stated at the conclusion, that the author purposes in a future communication entering into the development and the special adaptation of the peculiarities of the dental tissues which it has been the business of this paper to lay before the Society.

2. “On the Meteorology of the Lake District of Cumberland and Westmoreland, with a continuation of the results of experiments on the fall of Rain at various heights, up to 3166 feet above the Sea-Level.” By J. F. Miller, Esq., F.R.A.S. Communicated by Lieut.-Col. Sabine, R.A., For. Sec. R.S.